Heavy ion Single Event Effects test of CMOS Voltage Converter ICL7662 from Intersil

Test Report

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1 Introduction

This report gives heavy ion SEE test data on the CMOS Voltage Converter ICL7662 from Intersil. This work has been performed in the frame of the ST5 project.

2 Tested Devices

The tested devices are described in Table 1.

Type	**ICL7662**
Manufacturer	Intersil
Function	Voltage Converter
Package	Metal CAN8
Technology	CMOS
Date code	0135
Package marking	ICL7662MT Y/883BMO135AB MALAY JI013
Previous SEE testing	No data available

Table 1: description of the tested devices.

3 Test description

3.1 Irradiation facility

The tests have been performed at the Brookhaven National Laboratories in December 2001. The ion beams used are described in Table 2.

Ion	**Energy (MeV)**	**Average flux (#/cm2-s)**	**Range (μm)**	**LET ($MeVcm^2/mg$)**
Au-197	348	~5E+03	28	82.16

Table 2: Ions used at BNL.

3.2 Test set-up

The main objective of this test was to check the SEL sensitivity of this device. The nominal power supply supply current is about 350 μA. The Device Under Test (DUT) supply current was monitored about every 10 ms during the irradiation. As soon as this current reaches a limit set to 10 mA, the power supply is shutdown.

The output was also monitored with an oscilloscope to check for Single Event Transients (SET). Tests have been performed for both the switch on and off state.

The bias conditions are shown in Fig 1.

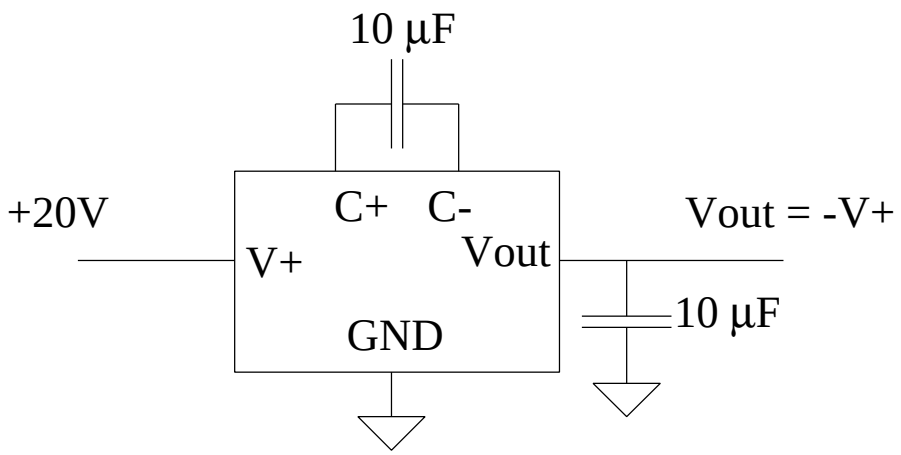

Fig 1: bias conditions for the SET test.

4 Test results

The test results are presented in Table 2.

run#	SN#	Ion	tilt	eff. LET (MeVcm^2/mg)	eff. Fluence (#/cm^2)	SEL	SET	X SEL (cm^2/dev)	X SET (cm^2/switch)
109	1	Au	0	82.16	1.00E+07	0	18	1.00E-07	1.80E-06
110	2	Au	0	82.16	1.00E+07	0	0	1.00E-07	1.00E-07

Table 2: test results.

The device is not sensitive to SEL up to the maximum tested LET of 82 MeVcm^2/mg.
The part has a very low sensitivity to SET with a SET cross section of about 2E-6 cm^2/device at the LET of 82 MeVcm^2/mg. A typical transient when is shown in Fig 2. The output voltage is going down to 0V for about 100 µs.

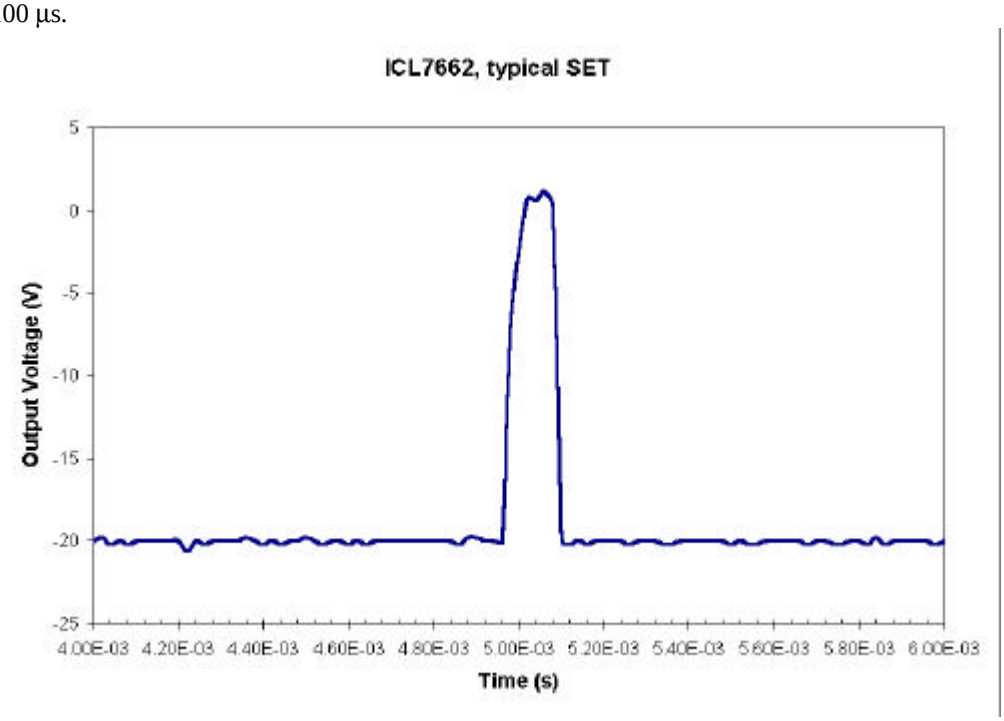

Fig 2: typical transient waveform.

5 Conclusions

The test results show that the ICL7662 is not sensitive to heavy ion induced SEL for space application. The ICL7662 has a very small SET sensitivity, and the event rate on ST5 will be negligible.